Real Exchange Rate and Trade Balance in Pakistan: An ARDL Co-integration Approach

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Real Exchange Rate and Trade Balance in Pakistan: An ARDL Co-integration Approach

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Abstract

The paper aims to find the long run and the short run relationships between trade balance, income, money supply, and real effective exchange rate for the period 1980 to 2011 in the case of Pakistan. The analysis is based on bounds testing approach to co-integration and error correction models, developed within an autoregressive distributed lag (ARDL) framework. The results of the bounds test indicate a stable long-run relationship between the trade balance, income, money supply, and real effective exchange rate variables. The estimated results show that increase in the level of income and depreciation in the real effective exchange rate are negatively associated with trade balance in the long and short run. Our results show that the money supply determines the behaviour of the trade balance in the long run but not in the short run. We also use innovation accounting by simulating variance decompositions (VDC) and impulse response functions (IRF) for additional inferences and find long-run relationship between trade balance and real effective exchange rate and income variables. However, we do not find long-run relationship between trade balance and money supply (M2). Our findings also suggest that Marshal-Lerner Condition for trade balance does not hold.

1. Introduction

In theory policy maker have various tools in their hands to adjust issues related to trade balance. One of these tools is manipulation of the exchange rate to acquire the improvement in trade balance. It is hypothesised that a nominal devaluation results in expenditure switching from foreign to domestic goods, hence increasing production. Besides, domestic goods become cheaper in the international market leading to higher exports. The increase in exports and decrease in import improve trade balance. Furthermore, if time lag is involved then the short and long run effects of currency depreciation are different. Initially, the trade balance deteriorates after depreciation and then begins to improve until it reaches its long-run equilibrium. The time path that the trade balance follows a J-Curve.

Nevertheless, the favourable impact of exchange rate depreciation on trade balance is inconclusive in the empirical literature. Rose (1990) studies the relationship between devaluation and trade balance for a sample of 30 countries and finds out that the impact of devaluation on the trade balance is insignificant for 28 countries, while one country shows a negative impact. He concludes that devaluation does not necessarily lead to an increase in the trade balance. These results imply that if exchange rate (devaluations) does not improve the trade balance, then the various stabilization packages that include some exchange rate realignment cannot be justified.

Now question arises that why empirical evidence are mixed in showing the impact of exchange rate on trade balance? Theory suggests that the policy tool of stabilizing trade balance through exchange rate is counter-productive if tradeable goods are not responsive to price and exchange rate changes. Hence if price elasticities of imports and exports are

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sufficiently low, the trade balance expressed in domestic currency is likely to be worsened. For example, Grubel (1976) has shown that persistent trade imbalances is due to faulty monetary policy and cannot be corrected by either devaluation (exchange rate policy) or the use of fiscal policy (expenditure changing policies). Miles (1979) argues that devaluation does not improve the trade balance but improves the balance of payments suggesting that the improvement is due to the capital account. He therefore concludes that the devaluation mechanism involves only a portfolio stock adjustment across the borders and is essentially monetary in nature.

The main objective of the study is to examine the validity of the argument that devaluation of real effective exchange rate improves the trade balance. It is pertinent to mention that imports exceed than the exports in Pakistan, leading to a large trade deficit every year. The reported balance of trade deficit for the year 2012-2013 is equivalent to USD 16522 million. We know that since 1982, until 1998, the Pakistan rupee has been characterized by a managed floating exchange rate. The rupee was pegged to a basket of currencies with the US dollar being the main anchor currency. In 1998, the monetary authorities adopted a multiple exchange rate system, which comprised an official rate (pegged to the US dollar), a floating interbank rate (FIBR), and a composite rate (combining the official and FIBR rates). With the economy recovering from the crisis in 1999, the three exchange rates were unified and pegged to the US dollar within a certain band. This band was removed in 2000. Since July 2000, Pakistan has maintained a floating rate, though central bank intervention continues. In addition, the study attempts to test the short- and long-run empirical relevance of the absorption and monetarist approaches by incorporating the variables of income and money supply in the model.

The remainder of this paper is organized as follows. Sections 2 and 3 discuss briefly the relevant literature and various theories of the balance of payments from three different views, namely the elasticity, absorption, and monetary approaches. Section 4 presents the econometric methodology and data. Section 5 discusses the empirical results, and Section VI provides the main conclusions and policy implications.

2. Literature Review

In the empirical literature, the impact of currency depreciation on a country's trade balance has been extensively examined in the context of the Marshall Lerner Conditions and the J-Curve theory. Bahmani-Oskooee and Niroomand (1999) have tested the Marshall Lerner condition for 30 developed and developing countries for the period 1960-1992. Application of cointegration analysis reveals that in many cases, bilateral trade elasticities are large enough to justify real depreciation of the dollar as a mean of improving U.S. trade balance.

Using the data from 1965 to 2002 Gomes and Paz (2005) and Tsen (2006) find a long-run relationship between the trade balance, RER, foreign and domestic income for Brazil and Malaysia. On the other hand, Bahmani-Oskooee and Ratha (2004) conduct a comprehensive literature review and find inconclusive results for the Marshal Lerner Conditions and J-curve. Furthermore, Singh (2002) finds that RER and domestic income have significant impact while foreign income has an insignificant impact on the trade balance of India.

Rose (1991) investigated the empirical relationship between the real effective exchange rate and trade balance for five major OECD countries. The study finds out that the exchange rate does not cause statistically significant impact on the balance of trade. Similarly, in another

study, using quarterly data for the bilateral trade flows between the US and other OECD countries, Rose and Yellen (1989) find insignificant relationship between the RER and balance of payments. Many other studies, such as Greenwood (1984), Mahdavi and Sohrabian (1993), and Rahman et al. (1997). Himarios (1989) and Bahmani-Oskooee (2001) also show weak statistical relationship between exchange rate and the trade balance.

Mahmud et al. (2004) argue that, although the Marshal Lerner Condition holds during fixed exchange rate periods, it is less likely in the flexible exchange rate regimes. Mussa (2002) and Edwards (2002) provide synoptic reviews and analysis of the RER. They note that exchange rate misalignment issues are very important in the exchange rate regime literature. In other words, the fundamental fluctuations of macroeconomic policies lead to the disequilibrium of the RER; if the nominal exchange rate remains fixed, the result is misalignment between the RER and the new equilibrium rate.

Liew et al. (2013) conduct a study on ASEAN-5 countries to examine the relationship between exchange rate and trade balance. They found out that nominal exchange rate does not affect the trade balance while real money affect the trade balance. They argue that the role of exchange rate in determining the trade balance has been exaggerated.

Using the ARDL cointegration approach, Duasa (2007) investigates the relationships between trade balance, RERs, income and money supply for the economy of Malayasia. In order to evaluate the monetary and absorption approaches to the BOP, he incorporates income and money variables along with the conventional elasticity approach. The relationship between exchange rate and the trade balance turns out to be insignificant. While money supply causes a negative and significant impact on the trade balance, which is consistent with the monetary approach. Similarly, domestic income exerts a positive impact on the trade balance which is consistent with the absorption approach. Furthermore, the Marshall Lerner Condition does not hole in the case of Malaysia. It implies that adjustment in the trade balance needs to be corrected through monetary and absorption approaches in Malaysian economy.

3. Theoretical Framework

In this section we will describe three approaches for adjustment in the balance of trade. These approaches are elasticity approach, absorption approach and income approach, respectively. The elasticity approach is related to the impact of exchange rate changes on the balance of trade. The roots of this approach can be traced in a static and partial equilibrium approach to the balance of payment (for details see, Bickerdike, 1920; Robinson, 1947; Metzler, 1948).

According to this approach, devaluation of domestic currency improves the balance of trade if the sum of price elasticities of domestic and foreign demand for imports is greater than unity. The essence of this approach works through substitution effects in consumption and production in response to changes in relative prices (domestic vs. foreign) as a result of devaluation. More precisely, the Marshall Lerner Condition states that for a favourable impact of devaluation on the trade balance it is necessary that absolute values of the sum of the demand elasticities of export and import must be greater than unity. Given that the Marshall Lerner condition is met, if exchange rates is above the equilibrium rate it will imply excess supply of foreign exchange and conversely if the exchange rate is below the equilibrium rate it will imply excess demand for foreign exchange.

The bases of absorption approach to the balance of payments can be traced to the earlier studies of Harberger (1950), Meade (1951), and Alexander (1952, 1959) when the focus of economic analysis shifted towards the balance of payment analysis. According to this approach, a country's balance of trade will improve if its output of goods and services exceed to its absorption-total domestic spending. Thus, devaluation helps to improve the balance of trade only when the gap between domestic output and spending increases. However, the theory has the following limitation: 1) the theory is appropriate only when the economy is below the full employment level because at the level of full employment domestic output cannot exceed further; 2) the theory ignores the inflationary consequences of devaluation; 3) it does not take account of capital movements while dealing with the balance of trade; 4) it ignores monetary factor.

The monetarist approaches is another approach which emerged at the end of 1950s (Polak, 1957; Hahn, 1959; Pearce, 1961; Prais, 1961; Mundell, 1968, 1971). According to this approach, the demand and supply of the money determine the balance of payment in an economy. If money demand exceeds to its supply then the excess of money demand is met by the inflow of money from abroad, thereby improving the trade balance. Conversely, if money supply exceeds to its demand then excess of money supply will be out flowed to other countries, thereby deteriorating the trade balance.

It is clear from the above discussion of different views that balance of trade depends on the movements in domestic income, money supply and exchange rate. In this study, we incorporate all three approaches simultaneously to estimate their role in determining the trade balance of Pakistan. Incorporation of three approaches in a single equation will not only help to assess their empirical relevance and validity but will also help to minimize the residual-unexplained variation- in the trade balance model.

4. Methodology and Data

The dependent variable, the trade balance, is constructed by taking the ratio of export value (X) to import value (M) following other studies in the literature (see, for example, Bahmani-Oskooee and Brooks (1999), Lal and Lowinger (2001), and Onafowora (2003). One major advantage of using the ratio for trade balance is that it is not sensitive to the unit of measurement and it can be interpreted as the nominal or real trade balance. The income variable is measured with Gross domestic product (GDP) and money supply is measured with M2. In order to obtain elasticities of the parameters we have converted all variables in natural logarithms.

In order to determine the short run and long run relationships between variables, Johanson Cointegration and VECM framework have been widely used in the literature. However, Pesaran et al. (2001) point out critical flaws with this approach. Therefore, we use ARDL model to determine the relationship between variables. The ARDL framework has been promoted by Pesaran and Shin (1995, 1999), Pesaran, et al. (1996), and Pesaran (1997). The ARDL framework provides consistent and robust parameter estimates for both the short run and long run. Furthermore, the ARDL method does not require pretesting of the variables. It means, this method can be used irrespective of the order of integration of variables. We can use it when all variables are purely *I(0)*, or *I(1)* or a mixture of both.

In order to obtain robust results, we utilize the ARDL approach to establish the existence of long-run and short-run relationships. ARDL is extremely useful because it allows us to describe the existence of an equilibrium/relationship in terms of long-run and short-run

dynamics without losing long-run information. The ARDL approach consists of estimating the following equation.

$$\Delta ln(TB)_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta ln\,(TB)_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta ln\,(GDP)_{t-i} + \sum_{i=0}^{n} \delta_i \Delta ln\,(M2)_{t-i} + \sum_{i=0}^{n} \emptyset_i \Delta ln\,(ER)_{t-i} + \mu_1 ln(TB)_{t-1} + \mu_2 ln(GDP)_{t-1} + \mu_3 ln(M2)_{t-1} + \mu_4 ln(ER)_{t-1} + \varepsilon_i \quad (1)$$

The first part of the equation with β_i, γ_i, δ_i, and $\emptyset_i$ represents the short-run dynamics of the model whereas the parameters μ_1, μ_2 , μ_3 and μ_4 represents the long-run relationship. The null hypothesis of the model is

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = 0$$

$$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq 0$$

We perform bounds testing to determine the long-run relationship between variables. For this, we perform F-test for the null hypothesis of no cointegration against the alternative it is not true. We compare the computed values of F-statistic with the critical values given by the Pesaran (1997) and Pesaran et al. (2001). A rejection of the null hypothesis would imply that we have a long-run relationship. In the bound testing procedure there are three possibilities. First, the computed F-statistic falls below the lower critical value (lower bound). In this case, we cannot reject the null hypothesis of no cointegration. Second, the computed F-statistic lies above the upper critical value (upper bound). In this case we reject the null hypothesis of no cointegration and conclude that there is a long-run relationship between variables irrespective of the order of integration of variables is 0 or 1. Third, nevertheless, if the test statistic falls in between the lower and upper bounds then result is indecisive. If all the variables are integrate of order zero *I (0)* then the decision is made on the bases of lower bound. Conversely, if all variables are integrated of order one *I (1)* then the decision is made on the bases of upper bound.

In order to obtain an optimal lag length for each variables, we estimate $(p+1)^k$ number of regressions. Where p represents the maximum number of lags and k indicates the number of variables in the model.

If bounds testing procedure confirms the long-run relationship, in next step, we estimate the following long-run model,

$$\Delta ln(TB)_t = \alpha_0 + \sum_{i=1}^{n} \beta_i ln\,(TB)_{t-i} + \sum_{i=0}^{n} \gamma_i ln\,(GDP)_{t-i} + \sum_{i=0}^{n} \delta_i ln\,(M2)_{t-i} + \sum_{i=0}^{n} \emptyset_i \Delta ln\,(ER)_{t-i} + \varepsilon_i \quad (2)$$

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After confirming and estimating the long-run relationship, in the next step we estimate the error correction model (ECM) to determine the speed of adjustment back to long-run equilibrium after a short-run disturbance. The equation for standard ECM is given as follows:

$$\Delta ln(TB)_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta ln\,(TB)_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta ln\,(GDP)_{t-i} + \sum_{i=0}^{n} \delta_i \Delta ln\,(M2)_{t-i} + \sum_{i=0}^{n} \emptyset_i \Delta ln\,(ER)_{t-i} + \phi_1 (ECM)_{t-1} + \varepsilon_i \quad (3)$$

To ascertain the goodness of fit of the ARDL model, diagnostic and stability tests are conducted. The diagnostic test examines the serial correlation, functional form, normality, and hetroscedasticity associated with the model. The structural stability test is conducted by

employing the cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

In order to obtain further inferences, we simulate variance decompositions (VDCs) and impulse response functions (IRFs). The basic purpose of VDCs and IRFs is to evaluate the strength and the dynamic interactions of causal relationships between variables in the model. Where, VDCs shows the percentage of a variable's forecast error variance in response to its own innovations and innovations in other variables. In other words, the VDC will help us to account for fluctuation in the trade balance which are attributable to fluctuations in the REER, income and money. Furthermore, we can assess the relative importance of REER, income and moony in relation to the trade balance variable. While the IRF helps to trace the directional responses of a variable in response to a one-standard deviation shock to another variable. It means we can find the direction, magnitude, and persistence of trade balance as a result of changes in the REER, income and money supply.

The variables used in this study, trade balance (TB), money supply (M2) and income (GDP), are taken from the Hand Book of Pakistani Economy. While the data on the real effective exchange rate (REER) is taken from the International Financial Statistics database. The time series span the time period 1980 to 2011.

5. Empirical Results

In order to determine the order of integration, we used Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) tests. Although the ARDL framework does not require the pre-testing of variables, the unit root test is helpful to assess whether ARDL model can be proceeded. The results obtained using unit root test are reported in Table 1, where column two and three shows the results for the Augmented Dickey-Fuller tests and column four and five show the results for Phillip Perron tests. The table shows that all variables are integrated to the order of one *I (1)* except real effective exchange rate which is integrated of the order of zero *I(0)*. Therefore, we can proceed for ARDL model.

Table 1: Unit Root Test

Variable	**ADF Test with trend and intercept**		**Philip Perron test statistic (with trend and intercept)**	
	Level	**First Difference**	**Level**	**First Difference**
Trade Balance [ln(E/M)]	**-1.20**	**-5.38*** **	**-1.23**	**-5.39*** **
Real Effective Exchange Rates [ln(REER)]	**-3.49****	-1.48	**-0.49**	**-9.01*** **
Income [ln(GDP)]	**-2.10**	**-3.84****	**-2.31**	**-3.84****
Money supply [ln(M2)]	**-2.60**	**-3.97****	**-2.02**	**-3.99****

*** shows significance at 1 %
** shows significance at 5 %
* shows significance at 10 %

Table 2: Estimated Long Run Coefficients using the ARDL Approach

ARDL (0,0,0,1) based on Schwarz Bayesian Criterion			
Dependent Variable: TB_t			
Variables	**Coefficient**	**Std Errors**	**P-Values**
Ln $(GDP)_t$	-2.91***	0.461962	0.0000
Ln $(M2)_t$	0.54**	0.134367	0.0004
Ln $(REER)_t$	-1.16***	0.260503	0.0001
Ln $(REER)_{t-1}$	-0.98	0.254608	0.0006
Constant	34.69***	0.0000	0.0000
R2	0.91	-	-
Adjusted-R2	0.90	-	-
F-Statistic (4, 32)	68.69***	-	0.0000
Durbin-Watson Statistics	1.72	-	-

Table 2: Estimated Long Run Coefficients using the ARDL Approach

ARDL (1,0,0,0) based on Akaike Information Criterion			
Dependent Variable: TB_t			
Variables	**Coefficient**	**Std. Error**	**Prob.**
TB_{t-1}	0.298937**	0.120951	0.0203
Ln $(GDP)_t$	-2.345716***	0.598342	0.0006
Ln $(M2)_t$	0.484090***	0.161935	0.0060
Ln $(REER)_t$	-1.508635***	0.259000	0.0000
Constant	26.30122***	5.476346	0.0001
R-squared	0.889716	-	
Adjusted R-squared	0.872749	-	
F-Statistic (4, 32)	52.44	-	0.0000
Durbin-Watson stat	2.249289	-	

The results in Table 2 show that GDP is an important determinant of trade balance. A 1% increase in real income yields to the deterioration of trade balance by 2.34%. However, the sign of the money supply variable is inconsistent with the monetary approach to trade balance. The theory indicates that a rise in money supply will drop interest rate and there will be outflows leading to appreciation of the local currency. This will increase; as a result, import and decrease export.

The impact of the real effective exchange rate on the trade balance is negative and statistically significant. It suggests that the Marshall-Lerner condition does not hold for Pakistan for the period of analysis. It indicates that the sum of elasticities of exports and imports is less than unity in the long run. The results indicated that a depreciation of our currency by 1% on average worsen the trade balance by 1.16%.

Table 3: Error Correction Representation for the selected ARDL-Model

ARDL (1, 0, 1, 0) based on Akaike Information Criterion			
Dependent Variable:$\Delta(TB)_t$			
Variables	Coefficient	Std. Error	Prob.
ΔTB_{t-1}	0.285771**	0.119115	0.0249
ΔGDP_t	-1.565469*	0.824645	0.0703
$\Delta M2_t$	0.824736	0.360991	0.0319
$\Delta M2_{t-1}$	-0.510332*	0.317007	0.1211
$\Delta REER_t$	-1.154907***	0.271129	0.0003
ΔECT_{t-1}	-0.921431***	0.163031	0.0000
Constant	0.000706***	0.058202	0.9904
R-squared	0.726049	-	-
Adjusted R-squared	0.654583	-	-
F-statistic	10.15943	-	0.000
Akaike information Criterion	-2.28		
Schwarz Criterion	-1.95	-	-
Durbin-Watson stat	1.817066	-	-

Table 3 shows the results of the error correction model (ECM) for trade balance. The negative sign of the coefficient of income variable supports the Keynesian view that the increase in income also increases foreign demand of goods and services, thereby worsening the trade balance. The impact of money supply in the short run is statistically insignificant on the trade balance, indicating that the impact of change in money supply is different in the short run than in the long run. However, the impact of the real effective exchange rate on the trade balance is almost the same in the long run and short run. Furthermore, the exchange rate has a negative and highly significant effect on the balance of trade. This implies that the Marshall-Lerner Condition does not hold even in the short run.

We apply a number of diagnostic tests to the ECM, finding no evidence of serial correlation, heteroskedasticity and ARCH (Autoregressive Conditional Heteroskedasticity) effect in the disturbances. The model also passes the Jarque-Bera normality test which suggests that the errors are normally distributed. The lagged error term is highly significant with a negative sign implying that short term error is likely to be corrected in the long run. The coefficient of -0.92 indicates a high rate of convergence to equilibrium, which implies that deviation from the long-term equilibrium is corrected by 92% over each year.

We compute VDCs and IRFs from estimated VAR model. The VDCs and IRFs are helpful tools to evaluate the dynamic interactions and the strength of casual relationships between variables. It is noteworthy that simulations of VDCs and IRFs face the problem of contemporaneous correlation because VAR innovations are likely to be contemporaneously correlated. This implies that a shock in one variable is likely to work through the contemporaneous correlation with innovations in other variables. The presence of contemporaneous correlation makes it difficult to isolate shocks to individual variables and, therefore, the response of a variable to innovations in another variable cannot be adequately determined (Lutkepohl, 1991). In order to address this identification problem, we use Cholesky factorization which orthogonalizes the innovations as suggested by Sims (1980). For this strategy, a pre-specified causal ordering of the variables is important because results obtained using VDCs and IRFs are likely to be sensitive to the ordering of variables in the presence of contemporaneous correlation. Sims (1980) suggests ordering of variables which starts with the most exogenous variable in the system and ends with the most endogenous variable in the system.

The results of variance decomposition and impulse response functions are reported in Table 4 and Figure 1, respectively. Figure 1 shows the time path of shocks in dependent variables in the VAR model in response to independent variables. The figure shows that any shock in the explanatory variables makes the impulse response dies out to zero. This shows stability of the system of vector error correction method (VECM).

In the figure the direction of variables' responses to innovation in the system are theoretically reasonable in most cases. Trade balance does react significantly to income innovations as it respond negatively for the first years and then subsides to zero after wards. As mentioned in the ECM model earlier, this result conforms to the Keynesian view that a rise in domestic income encourages more demand for imported goods and therefore tends to worsen the trade balance. The response to money supply of the trade balance is (negative/positive) for the first years and then die out to zero. As for the REER the figure suggest that TB of Pakistan felt significantly to the shock in the REER for the first 8 years and then die out.

As discussed earlier, the variance decomposition (VDC) which is an alternative method to impulse response functions (IRFs) for evaluating the effects of shocks to the dependent variables. It determines how much of the forecast error variance for any variable in a system is explained by innovations to each explanatory variable over a series of time horizons. Usually, own series shocks explain most of the error variance, although the shock will also affect other variables in the system. From Table 4, the VDC substantiates the significant role played by income, money supply, and REER in accounting for fluctuations in the trade balance of Pakistani. At the one-year horizon, the fraction of Pakistan's trade balance forecast error variance attributable to variations in income, money supply, and REER are 2.69%, 2.87%, and 37.28%, respectively. The explanatory power of all variables increases further at the 4-year horizon, but the percentage of trade balance forecast variance explained by innovations in REER is larger than explained by innovations in other variables. However, the portion of trade balance variations explained by all explanatory variables increases continuously over longer horizons, for which the percentage of forecast variances in the trade balance is largely explained by innovations in REER among other explanatory variables as it maintains higher percentages than the others.

Looking along the main diagonal, the results reveal that the own shock is relatively high for GDP and REER, at 100% and 93.17%, respectively. This implies the exogenity of GDP and

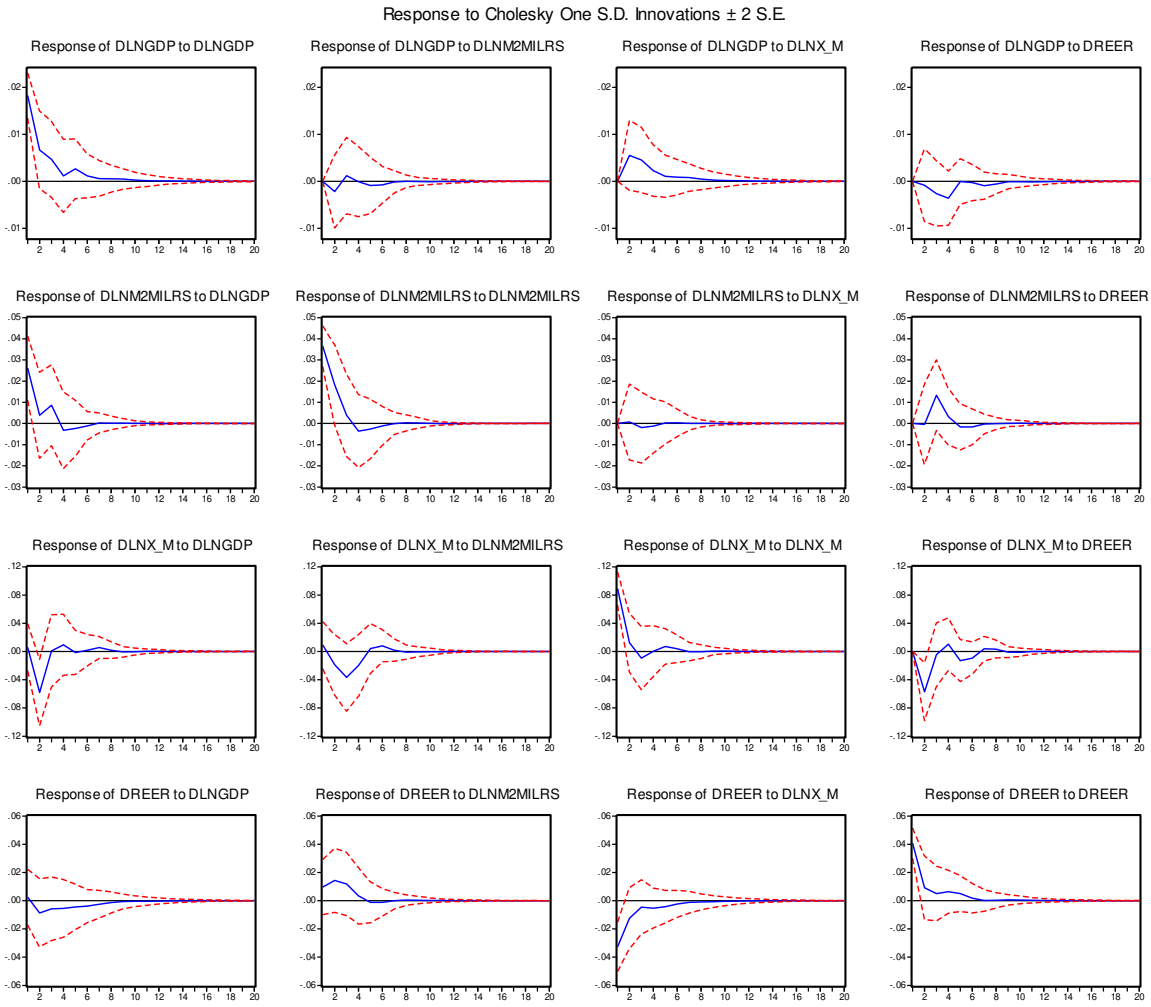
REER in VDCs, as after the first year shock, the variance appears to be less explained by innovations in other explanatory variables. On the other hand, the results shows that the percentage of variance explained by own shocks for M2 and TB are 67.63% and 57.14%, respectively.

Table 4: Variance Decompositions

% of Forecast Variances Explained by Innovation in				
Horizon	**TB**	**GDP**	**M2**	**REER**
(a)Variance Decomposition of TB				
1	**57.14**	**2.69**	**2.87**	**37.28**
4	**18.52**	**35.72**	**5.03**	**40.71**
9	**18.00**	**29.17**	**18.00**	**37.90**
15	**13.79**	**27.16**	**22.39**	**36.64**
24	**13.66**	**27.27**	**22.71**	**36.34**

(a)Variance Decomposition of GDP				
	TB	**GDP**	**M2**	**REER**
1	**0.00**	**100.00**	**0.00**	**0.00**
4	**0.15**	**92.49**	**0.08**	**7.26**
9	**0.22**	**84.44**	**4.44**	**10.89**
15	**0.54**	**78.67**	**8.24**	**12.53**
24	**0.88**	**74.78**	**9.18**	**15.13**
(a)Variance Decomposition of M2				
	TB	**GDP**	**M2**	**REER**
1	**0.00**	**32.63**	**67.63**	**0.00**
4	**0.44**	**41.32**	**57.98**	**0.37**
9	**0.33**	**48.41**	**49.19**	**1.40**
15	**0.74**	**51.62**	**41.08**	**6.53**
24	**1.108**	**53.71**	**34.01**	**34.01**
(a)Variance Decomposition of REER				
	TB	**GDP**	**M2**	**REER**
1	**0.00**	**1.03**	**5.78**	**93.17**
4	**7.70**	**1.51**	**20.12**	**70.65**
9	**7.11**	**1.52**	**28.22**	**63.14**
15	**6.81**	**1.62**	**29.44**	**62.11**
24	**6.78**	**1.83**	**29.35**	**62.02**

Figure 1: Impulse Response Functions



Response to Cholesky One S.D Innovations + (-) 2 S.E

6. Conclusion

This study tests three major alternative theories of balance of payments adjustments for the economy of Pakistan using annual time series data for the years from 1980 to 2011. These theories are the elasticities approach, the absorption approach (associated with Keynesian theory) and the monetary approach. The elasticities and absorption approaches assume unemployed resources while adjusting the issue of trade balance. The monetary approach, on the other hand, assumes full employment in the economy and keeps focus on the balance of payments. In the present study we attempt to assess the three major approaches simultaneously for the balance of trade in Pakistan.

We use bounds testing approach to cointegration, developed within an ARDL framework, to investigate the existence of a long run equilibrium relationship between trade balance, income, money supply and real effective exchange rate. The results provide evidence that money supply, real effective exchange rate and income play a stronger role in determining the long run behaviour of the trade balance in Pakistan. Similarly, the impact of income and real effective exchange rate on the trade balance is also significant in the short run as compared to the money supply. The policy implication is that difficulties in the trade balance may not be corrected through devaluation of the exchange rate as it is not helpful to improve the trade balance in the case of Pakistan. We need to seek alternative options of improvement

in trade balance such as diversification of exports, exploration of new markets to increase the elasticity of exports demand and to counter the increase in import due to growth.

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